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## ABSTRACT

Most institutions like to have at their disposal a list of schools comparable to their own for a variety of purposes. The criteria that can be used for determining such a list are, however, numerous and it would appear to be impractical to expect one list based on certain criteria to be useful for all purposes. The Institutional Data Card was designed to enable the Office of Institutional Studies at the University of Massachusetts to have at hand accurate and up-to-date information on a sample of institutions. These data will not only be used to determine lists of institutions comparable to the University in terms of various criteria, but will also be used in planning future studies and surveys. This paper focuses on the coding and operation of the card itself. A previous paper described the rationale behind the system, and a third paper will evaluate the actual operation of the system once it has been implemented. (Author/HS)

ED 067020

ON DEVELOPING A LIST OF INSTITUTIONS  
COMPARABLE TO THE UNIVERSITY OF MASSACHUSETTS

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Phase II: The Institutional Data Card

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EDUCATION & WELFARE  
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## PREFACE

Most institutions like to have at their disposal a list of schools comparable to their own for a variety of purposes. The criteria which can be used for determining such a list are, however, numerous and it would appear to be impractical to expect one list based on certain criteria to be useful for all purposes. The Institutional Data Card was designed, then, to enable the Office of Institutional Studies to have at hand accurate and up-to-date information on a sample of institutions. These data will not only be used to determine lists of institutions comparable to the University in terms of various criteria, but will also be used in planning future studies and surveys.

The rationale behind this system was described in an earlier paper (Phase I--Selecting the Variables and Choosing the Keysort System). The present paper focuses upon the card itself--its coding and its operation. A third, and final, paper will attempt to evaluate the actual operation of the system once it has been implemented.

Raymond G. Hewitt

Amherst  
January 12, 1968

## Introduction

Phase I--Selecting the Variables and Choosing the Keysort Principle described the variables thought to be appropriate for comparing institutions--in particular, Alexander Astin's<sup>1</sup> recent work on institutional environments was focused upon. The Keysort Principle was also briefly described, as was its application to the problem at hand. In the present paper, the Institutional Data Card itself will be focused upon and the coding procedures involved will be described. In a sense, the following represents a kind of "operations manual" for the system as it has evolved.

More than half of the data to be entered on the card were obtained from the individual institutions by use of the Institutional Data Questionnaire (see Appendices A and B). The sources of the remaining data are described in the following.

## Keysort

What was needed for the system under development was some method where-by the stored data would be easily accessible for both visual scanning and mechanical sorting. While electronic data processing could have been used for this purpose, it seemed unnecessary for this preliminary work. It was decided, then, to use a manual sorting technique--Keysort.

The Keysort Card comes in a variety of sizes and is printed to individual specifications.<sup>2</sup> Around the perimeter of the card are punched a series of holes each of which can be assigned a specific code or classification which is usually printed adjacent to it (see figure 1). The body of the card provides space for typed or written information (see figures 1 and 2).

A hand punch is used to "notch" the appropriate holes on the card in order to enable a "sort" to be made using a "sorting needle" which resembles an awl or ice pick. The sorting process itself is quite simple: (1) The sorting needle is passed through a group of cards at the desired code location. (2) The sorting needle is raised allowing those cards which have been notched to fall away from the needle. (3) The cards which remain on the needle do not generally<sup>3</sup> contain the desired information (since they are not notched) and are, therefore, set aside. (4) The cards which fell away from the needle are regrouped and steps (1)-(3) are repeated. (5) This process is repeated until the cards remaining contain only the information desired.

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<sup>1</sup>Dr. Astin is the Director of Research for the American Council on Education and has done a considerable amount of research related to the characterization of college environments.

<sup>2</sup>The adaptability of Keysort has enabled it to be used for a variety of purposes in business for many years and in education more recently.

<sup>3</sup>In some applications, the cards remaining on the needle may contain the desired data. Such an application is described on p. 8.



Figure 2

## INSTITUTIONAL DATA CARD - FRONT

INSTITUTION *				
ADDRESS (MAIN CAMPUS) *				
TELEPHONE *		BRANCH CAMPUSES *		
PRESIDENT *		ACADEMIC VICE PRESIDENT *		
BUSINESS VICE PRESIDENT *		REGISTRAR *		
ADMISSIONS *		INSTITUTIONAL RESEARCH *		
CHANCELLORS *				
OTHER				
TUITION AND FEES *	IN-STATE	OUT OF STATE	ROOM AND BOARD CHARGES *	NO. OF VOLUMES IN LIBRARY *
ACCREDITED BY:				
SIZE AS OF:	UNDER GRADUATE ENROLLMENT *		OUT OF STATE	FOREIGN
	IN-STATE			
GRADUATE ENROLLMENT *	OTHER *		TOTAL ENROLLMENT *	
AVERAGE FACULTY SALARY		COMPENSATION		
STUDENT FACULTY RATIO		FACULTY DISTRIBUTION		
		PROFESSOR	ASSOCIATE PROFESSOR	ASSISTANT PROFESSOR
DEGREE'S GRANTED: BACHELOR'S				
MASTER'S		INSTRUCTOR		
PH. D.		TOTAL FACULTY		
OFFICE OF INSTITUTIONAL STUDIES UNIVERSITY OF MASSACHUSETTS - AMHERST		OFFICE USE		

General information -- no coding is done on the front of the card.

Note: The data for starred (\*) items is obtained directly from the Institutional Data Questionnaire (see Appendix B).

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The Keysort System is, then, easy to use and enables a rapid sort of the cards to be made. Since the ordering of the cards has no effect on the operation, the cards need not be kept in any particular sequence in order to be used effectively. The relatively small initial cost of the system and its ease of operation combine to make this system well suited for the purpose at hand.

### The Institutional Data Card

The Institutional Data Card was designed, then, making use of the Keysort principle. The front of the card (figure 2) was retained exclusively for storing general information. Included here are the items the researcher would refer to frequently for general information--enrollment breakdown, chief administrators, etc. The back of the card (figure 1) contains primarily codable information (control; total enrollment; region, state and institution codes, etc.); space has also been left for future developments--additional general information and/or codable items.

As noted earlier, more than half of the data to be recorded on the card were obtained from a questionnaire sent to 230 institutions (approximately 200 were returned). With the exception of the data on funding (which needs further clarification) all of the data reported via the questionnaire are simply transcribed onto the card in the appropriate section. Those items on the card which are filled in in this manner are starred (\*) in figures 1 and 2. Since these items are self-explanatory, no further clarification is necessary. The remaining data to be entered on the card are to be obtained from several sources (see Appendix G for a complete list of documents used in obtaining these data).

On the front of the card (figure 2), several items require further clarification:

1. Accreditation

Accredited Institutions of Higher Education, September 1967, provides the data necessary here. If the institution appears in this document, the appropriate regional accrediting agency is noted. It is also noted if the institution has received any professional accreditation.

2. Average Faculty Salary

As listed for 1966-67 in the Summer 1967 issue of the AAUP Bulletin, pp 160-185.

3. Average Faculty Compensation

As listed for 1966-67 in the Summer 1967 issue of the AAUP Bulletin, pp 160-185

4. Student-Faculty Ratio

In order to be as consistent as possible, this figure is calculated from data already appearing on the card by using the following formula:

$$\text{S-F Ratio} = \frac{\text{Total Enrollment}}{\text{"Total Faculty"}}$$

5. Faculty Distribution

Data for this section come from the Summer 1967 issue of the AAUP Bul-

letin, pp 160-185. The distribution among ranks is that provided in the Bulletin; "Total Faculty" refers to the number of full-time faculty as reported in the Bulletin.

Most of the data recorded on the back of the card (figure 1) are codable and often require little more than a check mark alongside the appropriate item. The items regarding control<sup>4</sup> and composition of the student body (top left of the card), for example, need only be checked to indicate the appropriate designation. For the University of Massachusetts (figure 3) "Public", "State University" and "Coed" are checked since these are the appropriate classifications. Only if "Other" is checked is further clarification necessary--e.g., the "Other" might refer to a technical institute in which case this should be noted.

Similarly for "Schools and Colleges", "Highest Degree Offered" and "Total Enrollment", those schools and colleges which the institution indicated on the questionnaire, the highest degree the institution offers<sup>5</sup>, and the appropriate range for the total enrollment (as noted on the front of card) should each be checked.

The remaining data is obtained as follows:

1. Population, Per Capita Income

Figures for 1966 as presented in A Fact Book on Higher Education, First issue, 1967.

2. Per Capita State Taxes

Facts and Figures on Government Finance, Data for Fiscal 1965.

3. Per Capita Appropriations to All Higher Education

Based upon M.M. Chambers' Appropriations of State Tax Funds for Operating Expenses of Higher Education, 1966-67.

4. Astin's Variables<sup>6</sup>

Figures should be recorded alongside the appropriate item as listed in Who Goes Where to College?, Alexander Astin.

5. AAUP Ratings

Ratings should be listed as reported in the summer 1967 issue of the AAUP Bulletin, pp 160-185.

<sup>4</sup>Regarding control, if an institution is checked "Public", then the type of public institution ("State University", "State College" or "Other") should also be checked. Similarly for "Private" (see Appendix C for a list of those institutions regarding as "Ivy League").

<sup>5</sup>If the highest degree offered is a Bachelor's, then neither hole is checked.

<sup>6</sup>See Phase I--Selecting the Variables and Choosing the Keysort Principle for a complete description of Astin's Variables.





Figure 4

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## SAMPLE CARD - FRONT

<b>INSTITUTION</b> Massachusetts, University of				
<b>ADDRESS (MAIN CAMPUS)</b> Amherst, Massachusetts 01002				
<b>TELEPHONE</b> 413-545-0111		<b>BRANCH CAMPUSES</b> Boston; Worcester (Medical School)		
<b>PRESIDENT</b> John Lederle 545-2211		<b>ACADEMIC VICE PRESIDENT</b> Oswald Tippo, Provost 545-2464		
<b>BUSINESS VICE PRESIDENT</b> Kenneth Johnson, Treas 545-2213		<b>REGISTRAR</b> William Starkweather 545-2555		
<b>ADMISSIONS</b> William Tunis 545-2218		<b>INSTITUTIONAL RESEARCH</b> Robert Cope 545-2141		
<b>CHANCELLORS</b> John Ryan (Boston)				
<b>OTHER</b> Lamar Soutter, Dean of the Medical School 545-2111				
<b>TUITION AND FEES</b>	<b>IN-STATE</b> \$336/yr	<b>OUT OF STATE</b> \$736/yr	<b>ROOM AND BOARD CHARGES</b> \$798/yr	<b>NO. OF VOLUMES IN LIBRARY</b> 629,757
<b>ACCREDITED BY:</b> NEACSS; Bus, Chem, Eng, For, L.A., Nur, Psych, Teacher Educ				
<b>SIZE AS OF</b> Fall 1966	<b>UNDER GRADUATE ENROLLMENT</b> IN-STATE 9802		<b>OUT OF STATE</b> 789	<b>FOREIGN</b> 30
<b>GRADUATE ENROLLMENT</b> 2514	<b>OTHER</b> Stockbridge; 544		<b>TOTAL ENROLLMENT</b> 13679	<b>Boston: 2121</b>
<b>AVERAGE FACULTY SALARY</b> \$11,078		<b>COMPEMATION</b> \$11,193		
<b>STUDENT FACULTY RATIO</b> 18.8: 1		<b>FACULTY DISTRIBUTION</b>		
<b>DEGREE'S GRANTED: BACHELOR'S</b> 1671		<b>PROFESSOR</b> 158	<b>ASSOCIATE PROFESSOR</b> 157	<b>ASSISTANT PROFESSOR</b> 281
<b>MASTER'S</b> 545		<b>INSTRUCTOR</b> 133		
<b>PH. D.</b> 73		<b>TOTAL FACULTY</b> 729		
<b>OFFICE OF INSTITUTIONAL STUDIES</b> UNIVERSITY OF MASSACHUSETTS - AMHERST				

Completed card for the University of Massachusetts.

### Coding

"Coding" occurs only on the back of the card. For many of the items appearing on the left and right side of the card, this only requires notching those items which have a check mark alongside of them. For the "AAUP Ratings", only those ranks whose rating was identical with that for the University of Massachusetts--Amherst are notched, i.e., "Prof" is notched if the rating received was +B, etc. For "Astin's Variables", an item is notched if the score recorded falls within a five point range of the score reported for the University of Massachusetts, i.e., "Int" is notched if the score falls within 52-62 since the score for the University of Massachusetts was 57, etc.

The only remaining items to be coded (at present) are the "Region" and "Institution" codes appearing at the top and the "State" code at the bottom of the card. The "Region" code refers simply to the geographic region<sup>7</sup> of the country in which the institution is situated (see Appendix D). Here, only the appropriate region is notched. The remaining two codes are slightly more complicated.

As a glance at the card shows, there are groupings of holes numbered 1,2,4,7 as one reads right to left. Each of these groupings can be used to represent a digit from 0 to 9. A 0, for example, requires no notching; a 1, only the 1 hole is notched; for a 6, the 2 and 4 holes are notched; etc. For "State", there are two such groupings positioned adjacently. This arrangement allows a number from 0 to 99 to be coded by considering the right grouping the unit digit and the left grouping the tens digit. Similarly, the three groupings associated with "Institution" allow a number from 0 to 999 to be coded.

Each state, then, has been assigned a "State" code (see Appendix E) which is entered on the card as described above. In this way, the code for the state in which the institution is located is entered on the card. Similarly, each institution has been assigned an "Institution" code<sup>8</sup> (see Appendix F) which is entered as described. Thus, for the University of Massachusetts, the "State" code 22 and the "Institution" code 430 have been entered by appropriate notching (see figure 3).

### In Conclusion

Since the actual work of filling out and coding the cards has only just begun, it is impossible to give specific examples of just how the system works. It is easy to see, however, how the system can, and will, be used. If, for example, a list of state universities with a school of pharmacy is desired, only these two items need be sorted for. If we then decide to limit the enrollment to less than 25,000, a sort is made at the 25,000+ hole under "Total Enrollment" and those cards remaining on the needle are kept since they do not include institutions of 25,000+.

It is impossible, of course, to assess the success of this system until it is operational. In theory, however, it promises to be a useful aid to the researcher in a variety of tasks. And, while the coding described in the preceding is oriented toward selecting institutions comparable to the University of Massachusetts, this coding procedure could be easily altered for use at any institution.

<sup>7</sup>As used by the Office of Education, U.S. Dept. of Health, Education and Welfare.

<sup>8</sup>In assigning "Institution" codes, space was left between institutions to allow insertion of additional institutions at a later date.

## APPENDIX

Appendix A



*The Commonwealth of Massachusetts*  
*University of Massachusetts*  
*Amherst 01003*

August 21, 1967

Dear Sir:

The Office of Institutional Studies is currently in the process of establishing a card file of information on selected colleges and universities. This file will enable our office to have data readily available on these institutions for future research. These data will also be used to determine a sample of institutions "comparable" to the University of Massachusetts for use in future questionnaires and studies.

In order to implement this card file, the enclosed Institutional Data Questionnaire was devised so that the data gathered would be both up-to-date and accurate. I'm sure you'll find that most of the information requested is readily available and that it will only require a few minutes of your time to provide it. Your cooperation in this matter is needed in order that our file be accurate. Please give any statistical data as of Fiscal 1967, i.e., academic year 1966-67.

A post-paid envelope is provided for your convenience in returning this questionnaire. Please try to have your response in the mail by September 6.

A publication describing the exact nature of this card file and its potential uses will be available in a few months. I will, of course, be glad to send you a copy of this publication when it is available.

Thanking you in advance for your kind assistance, I remain

Sincerely,

*Raymond G. Hewitt*

Raymond G. Hewitt  
Research Assistant  
Office of Institutional Studies

## Appendix B

### INSTITUTIONAL DATA QUESTIONNAIRE

Your cooperation in providing the following information is needed in order that our office might maintain accurate data on your institution. Most items simply require filling in the appropriate figures. Please give any statistical data (items II-VI) as of Fiscal 1967, i.e., academic year 1966-67.

INSTITUTION \_\_\_\_\_

TELEPHONE NO. (Campus Switchboard) \_\_\_\_\_

I. CENTRAL ADMINISTRATION /Please fill in the name, title (if incorrect) and telephone number for each of the following administrators./

PRESIDENT \_\_\_\_\_

ACADEMIC VICE PRESIDENT \_\_\_\_\_

BUSINESS VICE PRESIDENT \_\_\_\_\_

REGISTRAR \_\_\_\_\_

ADMISSIONS OFFICER \_\_\_\_\_

DIRECTOR OF INSTITUTIONAL RESEARCH \_\_\_\_\_

CHANCELLORS OF BRANCH CAMPUSES \_\_\_\_\_

#### II. UNDERGRADUATE COSTS

Tuition and Fees: Resident \_\_\_\_\_ Non-resident \_\_\_\_\_

Room \_\_\_\_\_ Board \_\_\_\_\_

III. NUMBER OF VOLUMES IN LIBRARY \_\_\_\_\_

IV. ENROLLMENT

Undergraduate: In-state \_\_\_\_\_ Out-of-state \_\_\_\_\_ Foreign \_\_\_\_\_  
 Graduate \_\_\_\_\_ Other \_\_\_\_\_

V. DEGREES GRANTED (Please fill in the number of each awarded in Fiscal 1967)

Bachelor's \_\_\_\_\_ Master's \_\_\_\_\_ Doctorate \_\_\_\_\_

VI. FUNDING (Please fill in the amounts and/or percentages)

State \_\_\_\_\_ Federal \_\_\_\_\_ Private \_\_\_\_\_ Tuition \_\_\_\_\_

VII. SCHOOLS AND COLLEGES (Please check those schools and colleges which exist on your campus)

Agriculture	_____	Law	_____
Arts & Sciences	_____	Medicine	_____
Business Administration	_____	Nursing	_____
Dentistry	_____	Pharmacy	_____
Education	_____	Physical Education	_____
Engineering	_____	Public Health	_____
Home Economics	_____	Other:	_____
		_____	_____
		_____	_____

*Thank you for your cooperation!*

## Appendix C

### IVY LEAGUE SCHOOLS

In coding the Institutional Data Card, the following  
will be considered to be the "Ivy League" schools:

**MEN:** Amherst  
Brown  
Columbia  
Cornell  
Dartmouth  
Haverford  
Harvard  
U. of Pennsylvania  
Princeton  
Tufts  
Yale  
Wesleyan (Conn.)  
Williams

**WOMEN:** Barnard  
Bryn Mawr  
Conn. College for Women  
Goucher  
Jackson  
Mt. Holyoke  
Pembroke  
Radcliff  
Smith  
Vassar  
Wellesely



## Appendix D

### REGIONAL CODES

Listed below are the states which constitute the eight major regions\* used on the card. The abbreviations used for these regions are given in parenthesis.

#### NEW ENGLAND (NE)

Connecticut  
Maine  
Massachusetts  
New Hampshire  
Rhode Island  
Vermont

#### PLAINS (PL)

Iowa  
Kansas  
Minnesota  
Missouri  
Nebraska  
North Dakota  
South Dakota

#### SOUTHWEST (SW)

Arizona  
New Mexico  
Oklahoma  
Texas

#### MIDEAST (MD)

Delaware  
District of Columbia  
Maryland  
New Jersey  
New York  
Pennsylvania

#### SOUTHEAST (SE)

Alabama  
Arkansas  
Florida  
Georgia  
Kentucky  
Louisiana  
Mississippi  
North Carolina  
South Carolina  
Tennessee  
Virginia  
West Virginia

#### ROCKY MOUNTAINS (R)

Colorado  
Idaho  
Montana  
Utah  
Wyoming

#### GREAT LAKES (GL)

Illinois  
Indiana  
Michigan  
Ohio  
Wisconsin

#### FAR WEST (FW)

Alaska  
California  
Hawaii  
Nevada  
Oregon  
Washington

#### OTHER (no codes)

Puerto Rico  
Virgin Islands

\*This is the same regional breakdown used by the Office of Education of the U.S. Department of Health, Education and Welfare.

## Appendix E

### STATE CODES

The following gives both the "State" and "Regional" codes for each state. The number preceding is the state code to be used on the card; the abbreviation in parenthesis is the regional code.

- |                              |                         |
|------------------------------|-------------------------|
| 1. Alabama (SE)              | 31. New Jersey (MD)     |
| 2. Alaska (FW)               | 32. New Mexico (SW)     |
| 3. Arizona (SW)              | 33. New York (MD)       |
| 4. Arkansas (SE)             | 34. North Carolina (SE) |
| 5. California (FW)           | 35. North Dakota (PL)   |
| 6. Colorado (R)              | 36. Ohio (GL)           |
| 7. Connecticut (NE)          | 37. Oklahoma (SW)       |
| 8. Delaware (MD)             | 38. Oregon (FW)         |
| 9. District of Columbia (MD) | 39. Pennsylvania (MD)   |
| 10. Florida (SE)             | 40. Rhode Island (NE)   |
| 11. Georgia (SE)             | 41. South Carolina (SE) |
| 12. Hawaii (FW)              | 42. South Dakota (PL)   |
| 13. Idaho (R)                | 43. Tennessee (SE)      |
| 14. Illinois (GL)            | 44. Texas (SW)          |
| 15. Indiana (GL)             | 45. Utah (R)            |
| 16. Iowa (PL)                | 46. Vermont (NE)        |
| 17. Kansas (PL)              | 47. Virginia (SE)       |
| 18. Kentucky (SE)            | 48. Washington (FW)     |
| 19. Louisiana (SE)           | 49. West Virginia (SE)  |
| 20. Maine (NE)               | 50. Wisconsin (GL)      |
| 21. Maryland (MD)            | 51. Wyoming (R)         |
| 22. Massachusetts (NE)       | 52. Puerto Rico         |
| 23. Michigan (GL)            | 53. Virgin Islands      |
| 24. Minnesota (PL)           | 54.                     |
| 25. Mississippi (SE)         | 55.                     |
| 26. Missouri (PL)            | 56.                     |
| 27. Montana (R)              | 57.                     |
| 28. Nebraska (PL)            | 58.                     |
| 29. Nevada (FW)              | 59.                     |
| 30. New Hampshire (NE)       | 60.                     |

## Appendix F

### SAMPLE OF THE LIST OF "INSTITUTION" CODES.

387.		439.	
388.		440.	
389.		441.	
390.	Louisiana State University and A & M College	442.	Miami University (Ohio)
391.		443.	
392.		444.	
393.		445.	
394.	Louisville, University of	446.	Michigan State University
395.		447.	
396.		448.	
397.		449.	
398.	Lowell Technological Institute	450.	Michigan Technological University
399.		451.	
400.		452.	
401.		453.	
402.	Loyola University	454.	Michigan, University of
403.		455.	
404.		456.	
405.		457.	
406.	Maine, University of	458.	Minnesota, University of
407.		459.	
408.		460.	
409.		461.	
410.	Marietta College	462.	Mississippi State University
411.		463.	
412.		464.	
413.		465.	
414.	Marshall University	466.	Mississippi, University of
415.		467.	
416.		468.	
417.		469.	
418.	Marquette University	470.	Missouri, University of
419.		471.	
420.		472.	
421.		473.	
422.	Maryland, University of	474.	Missouri, University of (Kansas City)
423.		475.	
424.		476.	
425.		477.	
426.	Massachusetts Institute of Technology	478.	Montana State College
427.		479.	
428.		480.	
429.		481.	
430.	Massachusetts, University of	482.	Montana State University
431.		483.	
432.		484.	
433.		485.	
434.	Memphis State University	486.	Morehouse College
435.		487.	
436.		488.	
437.		489.	
438.	Miami, University of	490.	18 Morgan State University

## Appendix G

### DOCUMENTS PROVIDING DATA FOR THE INSTITUTIONAL DATA CARD

- (1) Accredited Institutions of Higher Education, September 1967, American Council on Education, Washington, D.C.
- (2) A Fact Book on Higher Education, First Issue, 1967, American Council on Education, Washington, D.C.
- (3) Astin, Alexander W., Who Goes Where to College?, Science Research Associates, Inc., Chicago, 1965.
- (4) Cass, James and Max Birnbaum, Comparative Guide to American Colleges, Harper and Row, New York, 1965.
- (5) College Facts Chart, 1966-1967, The National Beta Club, Spartanburg, South Carolina.
- (6) Facts and Figures on Government Finance, Tax Foundation, Inc., New York, 1967.
- (7) "The Economic Status of the Profession, 1966-67", AAUP Bulletin, Summer, 1967, pp 160-185.